

No. 36

January 1990

**SPOTTED OWL SURVEYS ON JDSF
AND MENDOCINO COUNTY FOREST LANDS**
Norm Henry

Numerous articles from a variety of sources have publicized the spotted owl controversy and associated issues in the past year. This controversy is currently centered on the remaining old-growth forests of Oregon and Washington, which most early research indicated was the preferred habitat for the northern spotted owl. The issue over preserving large tracts of old-growth timber in the Pacific Northwest relates to concerns about wildlife habitat, timber exports and community economic stability.

The forest products industry estimates 13,000 jobs would be lost if the spotted owl is listed as threatened (1). Federal timber availability has already been reduced due to recent court injunctions halting national forest timber sales in Oregon and Washington. The debate has extended to northern California, where cutting of old-growth redwood stands in Humboldt County is vehemently contested.

Environmentalists fear for the survival of the spotted owl species if current silvicultural and harvest volume trends are continued. They believe it can be used as an indicator for the health and sustainability of the forest ecosystem. The timber industry, on the other hand, is attempting to show through studies that the spotted owl can have a sustainable population in managed second-growth stands.

Due to their concerns, environmental groups forced the U.S. Fish and Wildlife Service (FWS) to reevaluate their initial decision and open the listing procedure for proposing threatened status for the northern spotted owl in April 1989. This procedure, which entails reviewing scientific, commercial and public comment data, is required under the Endangered Species Act of 1973. This act establishes federal procedures for identifying and protecting endangered plants and animals (2). The decision on whether or not to

CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION
Robert E. Paulus, Acting Director

George Deukmejian
Governor
State of California

Gordon K. Van Vleck
Secretary for Resources
The Resources Agency

list the owl will be made by June 23, 1990. If it is listed, significant effects on forest management within the range of this species will result.

The California Department of Fish and Game (CDF&G) presently lists the spotted owl as a "species of special concern" (3). Standardized mitigation measures for timber harvest plans (THP's), however, have not been developed for spotted owls (4). Currently, the California Department of Forestry and Fire Protection (CDF) is encouraging cooperation between the landowner and CDF&G to preserve nest and roosting sites. CDF requests the landowner notify CDF&G biologists if a nest site is found in a harvest area. They will make recommendations for protection. If the decision is made to list the northern spotted owl as a threatened species, every THP would have to be evaluated for potential adverse impacts and specific mitigation measures will be developed.



Photo by Bill Nietro (BLM, OR)

Studies and Sampling Methods

Three private forest industry studies in California have recently addressed the several issues involved in the listing process (5). Determining the distribution of spotted owls in managed forests with a variety of age groups is a key research need. Even more important is learning about the reproductive and fledgling success for long term population sustainability in these forest types.

The three independent studies were carried out by the Timber Association of California, the Pacific Lumber Company, and Louisiana Pacific (LP)/ Georgia Pacific (GP)/ CDF&G, in a cooperative venture. The objective of the last study was to gather biological and habitat preference data for the spotted owl in managed, second-growth coastal redwood forests of Mendocino County (4). It was devoid of contiguous tracts of the old-growth forest habitat type and carried out between April 1 and November 30, 1989. CDF&G staff designed this study and directed the gathering of the data.

As an adjunct to the cooperative industry study, a survey was initiated between the Jackson Demonstration State Forest and CDF&G biologists to get preliminary information on spotted owl occurrence on the State Forest. Surveys were conducted on seven nights over a period of three months. The first three nights were in the first half of May and the last four were in the latter half of July 1989.

The sampling methods for these studies followed established procedures used by the U.S. Forest Service (USFS) in their surveys on National Forest land. All of the spotted owl occurrence and location information came from "night-calling"

surveys. While the USFS has used tape recordings of owl calls, local surveyors used a vocal imitation of the various forms of the owl call. The three established methods of survey are leapfrog, point and cruise. With the leapfrog method, one person walks calling constantly, while a second person drives down a road a specified distance and parks. He/she then continues calling on foot until the first person catches up in the vehicle. The point method entails standing in one spot for ten minutes and calling in several directions over that time period. If a response is heard, follow-up calls are made to try to determine the owl's gender, approximate location, and whether a pair exists. Once finished at that site, the caller drives approximately one-half to one mile along a road and repeats the procedure. The cruise method requires moving and calling frequently while walking down a road.

Results and Discussion

A total of ten northern spotted owls, representing eight territories, responded to vocal calling with the point and cruise methods on the seven nights that Jackson Demonstration State Forest was visited. Except for one pair found at a 50-acre old-growth stand (Dresser Grove), all of the owls which responded were in second-growth or cutover areas. Approximately 70 to 80 miles of road or trail were surveyed on the State Forest during this study. These roads were distributed fairly evenly over the Forest, but represent a fairly small sample of each area. Therefore, the numbers obtained do not represent a full census of the spotted owl population on JDSF.

The LP/GP/CDF&G survey utilized the leapfrog, point and cruise

sampling methods. A total of 535 miles of transects within the study area was surveyed in coastal Mendocino County. The location of each spotted owl response was given a unique site designation number (4). Owls were detected at 90 sites through the end of November 1989. It is important to note that it was not within the scope of the study to have a complete census of all the spotted owls within the study area, so any figure calculated from this study should be considered the minimum density.

Fifty-one of the 90 sites surveyed had both male and female owls. Single males were at 23 of the sites and single females were at 13. A subsample of 31 sites were evaluated for pair occupancy and habitat preference. Twenty-five sites were verified as having pairs, with fledged young produced by eight of these pairs. Six platform stick nests and one cavity nest were found. In this subsample, all but two of the sites were in managed second-growth stands.

The habitat characterization of the spotted owl was another aspect of this study. Research in both the Northwest and the Rockies has indicated a strong preference by the owl for dense, uneven-aged stands with a closed canopy. It is thought that thermal sensitivity of the spotted owl and protection from predation by the Great Horned Owl may influence the selection of preferred habitat. The Mendocino County study reported that spotted owl habitat here may be characterized as one which retains a moderate to dense canopy closure and has a multi-layered stand structure. Hardwoods may contribute heavily to these stands. A large proportion were found within close proximity to riparian zones, which may be related to the food and thermal requirements of the owl.

Radio telemetry techniques used in past studies have shown home range size to vary considerably. Their range was found to average 1500 acres in Northern California, 2200 acres in Oregon, and 4500 acres in Washington. This increase in range size with higher latitudes is thought to be correlated with a higher degree of forest fragmentation in the north and lower availability of prey (6).

Despite all the studies being done, there remains a diversity of opinion among wildlife biologists as to the viability of spotted owl populations in habitats other than the old-growth and in increasingly fragmented forest cover. Some biologists believe that only a small minority of owls are found in second-growth and have no long term viability, while others, armed with recent study results contest that position. In any event, many biologists think it is extremely difficult to accurately assess the long term viability of the species in various habitat types. In 1990, the three industry studies previously mentioned will do banding and telemetry work to better assess the biological needs of the spotted owl.

Hopefully, these continuing studies will shed more light on this controversial issue.

References:

- (1) Blondin, A. R. 1989. The owl complex. J. of For. 87(8): 37-40.
- (2) Robertshaw, F. 1989. Public participation and the listing process. J. of For. 87(8):39.
- (3) Remsen, J.V. 1978. Bird species of special concern in California. California Dept. of Fish and Game, Wildlife Management Branch. Sacramento, CA. Adm. Rep. 78-1.
- (4) Pious, M. 1989. The Northern spotted Owl in second-growth forests of Mendocino County, California - Preliminary Results. Coop. Report by Louisiana-Pacific, Georgia-Pacific, and CA Dept. of Fish and Game. 105 pp.
- (5) Self, S, R. Anderson and D. Kelly. 1989. Spotted owl source book. Timber Association of California. Sacramento, CA. p. 2
- (6) Miller, G. 1989. Northern spotted owl field tour, Eugene OR. Oct 12. Sponsored by the West. For. and Cons. Assoc.

* * * * *

GRADUATE THESES PRODUCED FROM RESEARCH CONDUCTED ON JACKSON DEMONSTRATION STATE FOREST Peter Cafferata

A primary goal for JDSF is to carry out research on the various aspects of forestry in the redwood region. One avenue to do this has been to encourage university forestry departments to do experimental projects here. Since 1980, funding for many researchers has been provided through CDF's Forest Resource Improvement Fund (FRIF). Each year, money is made available to the various State Forests for

research projects which the managers feel have the highest priorities. Graduate students have often been the actual principal field investigators and many theses have been produced. In addition, we have been able to obtain special funding from CDF for large scale projects. Most notably, this has occurred for the Caspar Creek Watershed Study, which we are jointly conducting with the US Forest

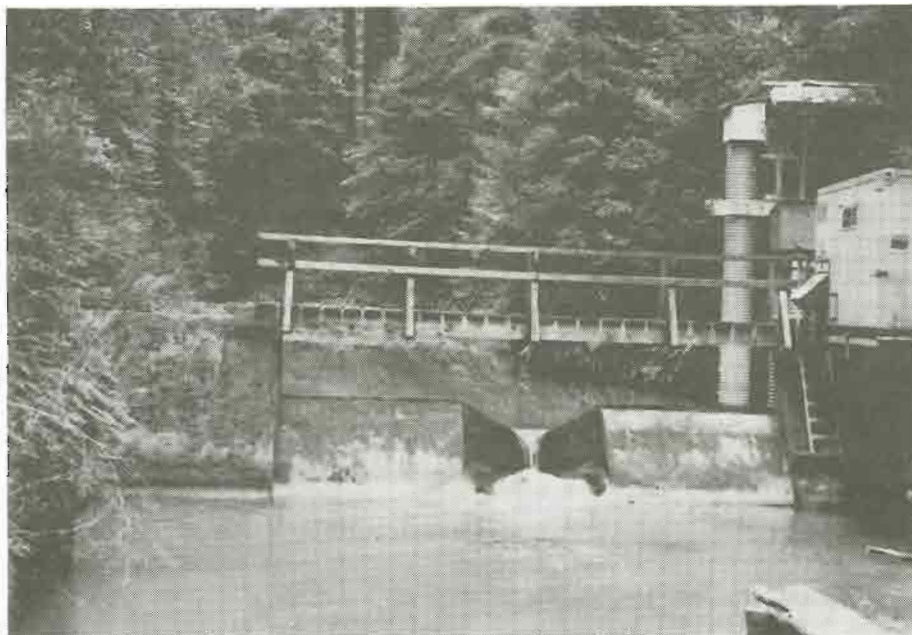


Fig. 1. The South Fork of Caspar Creek in the winter.

Service's Redwood Sciences Laboratory. Their close ties with Humboldt State University at Arcata has led to the production of numerous graduate theses.

While most of the research done on JDSF has resulted in various papers and notes, we are proud that seven masters theses and four Ph.D. dissertations have been produced from work done here over the past twenty years. As we move into the 1990's, we would like to encourage the departments which deal with natural resources at the various universities in California to consider conducting research here on JDSF. There are many areas of redwood silviculture, harvesting systems, watershed impacts, aquatic and terrestrial biology, and wildlife management which need further research. As the only large public holding in the redwood region which is harvesting timber, we offer a unique opportunity to the research community. A summary of the theses produced from work done here follows.

Watershed/Soils

Hydrologic Properties of One Major and Two Minor Soil Series of the Coast Ranges of Northern California. Edward P. Wosika. 1981. M.S. Thesis Humboldt State Univ. Arcata. 150 pp.

The hydrologic properties of the primary soil series found in the Caspar Creek watershed were evaluated. The Hugo soil series (currently broken down into 12 different soil series) exhibited great variation in its hydrologic properties from one location to another. The Caspar and Mendocino series varied only slightly. The main factor producing differences with the Hugo series is the degree of colluvial mixing, which is closely related to slope position.

Effects of Timber Harvesting on the Late Time of Caspar Creek Watershed. Karen H. Sendek. 1985. M.S. Thesis. Humboldt State Univ. Arcata. 46 pp.

This was the first of three theses analyzing changes in runoff after road construction

and selective tractor logging in the South Fork of Caspar Creek. (See Fig. 1.) Hydrograph lag time, or the amount of time between the midpoint of precipitation and storm runoff, was computed for several storms before and after logging. After timber harvesting, the lag time was found to significantly decrease for large winter storms, indicating that runoff occurred sooner.

Changes in Storm Hydrographs After Roadbuilding and Selective logging on a Coastal Watershed in Northern California. Kenneth A. Wright. 1985. M.S. Thesis. Humboldt State Univ. Arcata. 55 pp.

The impact of compacting 15 percent of the South Fork of Caspar Creek through the construction of roads, landings, and skid trails on storm flow runoff was examined. Large winter storm peaks and volumes were not significantly increased by road construction or logging. Small storms peaks in the fall were increased following these activities, since less water in the soil was lost through evapotranspiration in the summer.

The Effects of Selective Logging on Low Flows and Water Yield in a Coastal Stream in Northern California. Elizabeth T. Keppeler. 1986. M.S. Thesis. Humboldt State Univ. Arcata. 137 pp.

Streamflow data for the North and South Forks of Caspar Creek was analyzed to determine the effects of harvesting on volume, timing and duration of low flows, and annual water yield. Significant increases in streamflow were detected for both the annual period and the low flow season following logging. Greater relative increases were observed for the summer low flow period, but they were short-lived.

Sediment Transport and Storage on the North Fork of Caspar Creek, Mendocino County, California. Michael Napolitano. M.S. Thesis. Humboldt State Univ. Arcata. In progress.

A sediment routing study was done on a 2,400-meter channel reach from above the North Fork weir to a partially collapsed 19th century logging dam. Fifty-six channel cross-sections were monitored between 1979 and 1988 to assess changes in sediment storage. Results showed that changes in sediment storage and yield were low. Most of the changes were concentrated within the active channel; valley fill terraces showed little variation.

Dynamics of Naturally Occurring Subsurface Soil Pipes in North-Coastal California. Jeffrey S. Albright. M.S. Thesis. Humboldt State Univ. Arcata. In progress.

Subsurface soil pipes, or natural underground cavities, were studied at the heads of gullied channels in three small headwater drainages of the North Fork of Caspar Creek. Data recorders were used to monitor discharge. During storm events, nearly all the discharge observed from the sites came from pipeflow. Piping networks are a locally significant mechanism for routing water and sediment from steep upland watersheds.

Stream Ecology

The Effects of Logging Road Construction on Insect Drop into a Small Coastal Stream. Lloyd J. Hess. 1969. M.S. Thesis. Humboldt State Univ. Arcata. 58 pp.

Road construction on the South Fork of Caspar Creek caused very high suspended sediment levels immediately after construction in 1967. During this first year, most of the aquatic insects were

killed. The next year, chironomids (midge larvae) increased dramatically by filling the niches left by the organisms removed by the heavy sediment load.

The Response of Algal Communities in Streams to Timber Harvest Activities. Franklin K. Ligon. 1986. M.S. Thesis. Univ. of Calif., Berkeley. 58 pp.

Comparisons were made on the amounts of both filamentous and non-filamentous algae found in stream in a heavily logged watershed (Hare Cr.) and a stream in an unlogged second-growth watershed (North Fork of the South Fork of the Noyo River). Significantly more filamentous and less non-filamentous algae was found in Hare Creek. Increases in solar radiation, nutrient loading and suspended sediment from logging explained these differences.

Redwood Ecology/Silviculture

A Study of Uneven-aged Management Strategies in Young-Growth Redwood at Jackson Demonstration State Forest. Clifton E. Kennedy. 1983. M.F. Professional Paper. Univ. of Calif., Berkeley. 127 pp.

Three different methods of uneven-aged management were implemented on 240 acres in Railroad Gulch. Single tree selection, group selection, and a combination of these two methods were tested. The initial stages of designing and implementing the project are presented. Growth and yield projections, and economic evaluations are provided.

Early Changes in Coast Redwood (Sequoia sempervirens) Understory Vegetation Following Forest Harvest Activities. Roy A. Woodward. 1986. Ph.D. Dissertation. University of Calif., Davis. 139 pp.

Seven second-growth redwood stands on JDSF were sampled for understory vegetation species composition, frequency, and cover ten years after being partially harvested. A significant increase in understory vegetation was documented for all these sites. Redwood had poor initial establishment from seed, but sprouts arose from almost 100% of the stumps. Natural regeneration of conifers in partially cut stands can be sufficient to provide adequate stocking. It is doubtful that this will permit continued partial cutting with the intent to develop an uneven-aged stand, however, based on related research in this area.

Conceptualization and Preliminary Development of an Organismal Level Process Model for Simulating Tree and Stand Growth and Yield. Janet I. Cavallaro. 1989. Ph.D. Dissertation. Univ. of Calif., Berkeley. 101 pp.

Relationships were generated between a codominant coast redwood tree's growing space and its leaf surface area, its volume growth rate, its volume, stand growth, and stand yield. Optimal thinning treatments for even-aged wood stands were devised based on this model. Tree volumes and stand yields were projected for stands five years older.

Forest Entomology/Pathology

Factors Affecting the Abundance and Activity of Hylastes nigricornis, Steremnius carinatus and Other Insects in Roots of Douglas-fir Stumps. Jill W. Lowmbery. 1988. Ph.D. Dissertation. Univ. of Calif., Berkeley. 131 pp.

Black-stain root disease in Douglas-fir is caused by the fungus Leptographium wageneri, which is vectored by phloem feeding insects. Timber harvesting and road building create

stumps which attract the insects. Douglas-fir roots in mature stands which had been selectively logged, commercially thinned, and clearcut were examined.

Stand and Site Conditions Associated with Leptographium wageneri var. pseudotsugae in Douglas-fir Trees and Effects of Infection on Host Physiology. Thomas T. Lawson. 1988. Ph.D. Dissertation. Univ. of Calif., Berkeley. 168 pp.

The effects of the fungus causing black-stain root disease on water transport in and growth of Douglas-fir seedlings and pole-sized trees were evaluated. Terminal and radial growth rates of infected and uninfected trees were measured. Also, a study was made of 35,000 ha, almost half of which was on JDSF, to determine site and stand conditions associated with this fungus. A future article in this Newsletter will discuss the results.

* * * * *

NEW PUBLICATION AVAILABLE

Consulting research forester James Lindquist has authored California Forestry Note No. 102, which is entitled "Hare Creek Sprout Stocking Study on Jackson Demonstration State Forest." This report presents data on red-

wood sprouts after clear-cutting and partial cutting 85-year old young-growth stands. Data included number of clumps and sprouts per stump. Copies can be ordered by writing our office in Fort Bragg.

JACKSON DEMONSTRATION STATE FOREST
802 N. MAIN STREET
P.O. BOX 1185
FORT BRAGG, CA 95437